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10/719,267

11/21/2003

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EXAMINER

DANG, THUAN D

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Please find below and/or attached an Office communication concerning this application or proceeding.

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/719,267
Filing Date: November 21, 2003
Appellant(s): DATH ET AL.

**MAILED
MAY 31 2007
GROUP 1700**

William D. Jackson
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 2/15/2007 appealing from the Office action mailed 4/14/2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

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The following are the related appeals, interferences, and judicial proceedings known to the examiner which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal:

As listed in the Appeal Brief.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

The first paragraph of the "Summary of Claimed Subject Matter" is directed to claim 1. However, the silicate ratios and the MFI type zeolite summarized are not in the claim.

The second paragraph is directed to additional limitation of claims 23 and 31, with claim 31 having the propylene yield claimed.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

EP0034444	HAAG et al	9-1981
EP0109060	COLOMBO et al	05-1984

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-3, 5, 12, 13, 16-25, and 30 are rejected under 35 U.S.C. 103(a) as obvious over Haag et al (EP 0034444).

Haag discloses a process of hydrocracking a feedstock in the presence of hydrogen and a zeolitic catalyst, such as ZSM-5 to produce lower molecular weight products (the abstract; page 20, line 22 thru page 21, line 17; page 23, lines 5-26).

Haag does not disclose specifically cracking an olefinic feed. However, one having ordinary skill in art would obviously hydrocrack an olefinic feed as disclosed on page 20, lines 12-15. This is also affirmed by the Board of Appeal Decision mailed on 9/24/2003 (see page 6 of the decision of patent application 09/594,059).

Haag is silent as to how or when the hydrogen is added to the reaction zone. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Haag process by adding the hydrogen to the hydrocarbon feed **before** the contacting with the catalyst to **mix well** materials since it is well-known that mixing well of reactants makes the reaction faster. The hydrocracking of Haag requires the presence of hydrogen. Therefore, hydrogen and hydrocarbon and the catalyst **must be present** at the time the reaction occurs. Otherwise, the hydrocracking process cannot occur when hydrocarbon is present with the catalyst without hydrogen. Further, applicants do not show any criticality for adding hydrogen with the hydrocarbon prior contacting with the catalyst.

Haag does not disclose specific amounts of olefins contained in the feedstock as called for in claims 1, 22, and 30. However, as disclosed in page 21, lines 12-18, and page 23, lines 5-

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26, one having ordinary skill in the art would have reasonably used olefins feedstocks for the hydrocracking process and expect that using any feedstock containing any amount of olefins would yield similar results.

Haag is silent as to what kind of hydrocarbon compounds, namely propylene contained in the lower molecular weight products are. However, these lower compounds must inherently be lighter olefinic compounds since Haag process is operated by using substantially the same feedstock (olefins versus olefins), under the same reaction (cracking in the presence of hydrogen) and in the presence of substantially the same catalyst (zeolitic catalysts).

In addition, the presently claimed property of the product would obviously have been present once the Haag product is provided. Note *in re Best*, 195 USPQ at 433, footnote 4 (CCPA 1977) as to the providing of this rejection under 35 USC 103 in addition to the rejection made above under 35 USC 102.

On page 20, line 27 thru page 21, line 1, Haag discloses that the pressure of the process can be maintained at from atmospheric to 10,000 psig and a mole hydrogen/hydrocarbon ratio of from 0 to about 20. According to these teachings, the appellants' claimed hydrogen or olefin partial pressure must be covered by the same of Haag.

The temperature and LHSV of the reaction are disclosed by Haag on the paragraph bridging pages 20 and 21.

On page 23, lines 5-26, Haag discloses that hydrocracking is operated at **about** 1000°F (537.7°C) which makes the appellants' claimed temperature overlapped.

Recycling of unreacted hydrogen is obvious to one having ordinary skill in the art who wishes to optimize the cost of raw material for the process.

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The appellants' claimed feedstock are **well-known** being rich with olefins (see page 13, lines 9-23).

Therefore, it would have been obvious to one having ordinary skill in the art who wishes to practice the Haag cracking process to chemically convert olefins would select feedstocks rich with olefins well-known in the chemical industry such as light cracked naphtha and C4 cut from a FCC as claimed by appellants since it is expected that any olefinic feedstock cracked under the Haag process would yield lower olefins.

Haag is clearly silent as to using dienes for the cracking. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Haag process by removing any dienes, if present, from the olefinic feedstock to arrive at the appellants' claimed process.

On page 23, lines 5-26, Haag discloses that hydrocracking is operated at **about** 1000°F (537.7°C) which makes the appellants' claimed temperature overlapped. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Haag process by operating the hydrocracking at 540°C to arrive at the appellants' claimed process.

Claims 6-11, 14, 26-29, and 31-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haag et al (EP 0034444) in view of Colombo et al (EP 0109060).

Haag discloses a process as discussed above.

Haag does not disclose using silicalites having a Si/Al ratio of at least 180 for catalyzing the cracking reaction. However, Colombo discloses a cracking process catalyzed by silicalite

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having Si/Al of at least 175 to infinity having a high yield of propylene (see the abstract; see examples).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Haag process by using the silicalite taught by Colombo which has a high yield of propylene.

Examples of Colombo shows that addition to propylene, ethylene and other high olefins are present in the product.

Neither Colombo nor Haag discloses recycling the content of ethylene and higher olefins. However, it would have been obvious to one having ordinary skill in the art to have modified the Haag process modified by the Colombo teachings by recycling ethylene and unreacted higher olefins since (1) Colombo discloses that recycling of C4- olefins (including ethylene) formed during the reaction the conversion to propylene will be enhanced (col. 3, lines 28-30) and (2) recycling of unreacted olefinic reactants will decrease the cost of raw material. Further, it has been held that recycling of hydrocarbons is obvious. *In re Marsheck* 169 USPQ 721 (CCPA 1971).

In exemplified processes, Colombo can produce products having the appellants' claimed propylene yields.

(10) Response to Argument

The Board is requested to review the decision on parent application serial number 09/594,059 by the Board dated on 9/24/2003 since the claims in the parent application are very similar to the present claims except two newly added features found in the present claims:

(1) the present hydrocarbon feedstock containing olefins in “an amount within the range of 10 to 100 wt.%”.

(2) adding hydrogen to the olefin-rich feedstock prior to contact of said feedstock with said crystalline silicalite.

In the last paragraph of page 6 of the Appeal Brief, appellants admitted that the present arguments are similar to those made in the appeal of parent application serial number 09/594,059 except the two features mentioned above.

The argument that the patent to Haag does not disclose the cracking of an olefin-rich feedstock in the presence of hydrogen to enhance the stability of the catalyst and silent as to how or why the hydrogen is added to the reaction as involved in appellants’ invention is not persuasive since this feature has been decided by the Board of Appeals on the first full paragraph of page 8 in the Decision on Appeal of the parent case.

The argument that the reference Haag does not denote one having ordinary skill in the art the cracking of an olefin-rich hydrocarbon feedstock containing 10-100 wt% olefins as required in the claims is not persuasive since as on the decision of the Board in the parent case (see page 6 of the Decision on Appeal), the Board determined that one ordinary skill in this art would have reasonably used olefin feedstock in the hydrocracking process of Haag in the related disclosure of Haag at page 20, lines 22-25, page 21, lines 12-17, and page 23, lines 5-26. Regarding the percentage of the olefins in the feed, as disclosed in page 21, lines 12-18, and page 23, lines 5-26 of the reference Haag, one having ordinary skill in the art would have reasonably used olefins feedstocks for the hydrocracking process and expect that using any feedstock containing any amount of olefins would yield similar results.

The argument that Haag fails to disclose that the effluent and the feedstock have olefin contents with the range of $\pm 15\%$ as recited in all of the claims, namely ± 10 as recited in claims 26, 26, and 27 is not persuasive since the Board affirmed this feature in the paragraph bridging pages 7 and 8 of the Decision of Appeal of the parent application 09/594,059.

The argument that in regard to claims 2,3, 23, and 24, the claimed hydrogen partial pressure cannot be found in the Haag reference is not persuasive since the Board decides this feature on the second full paragraph on page 8 in the Decision on Appeal of the parent application 09/594,059.

The argument that Haag fails to or render obvious the olefin partial pressures found in claims 18 and 19 or the temperatures found in claims 16 and 17 is not persuasive since as decided by the Board of Appeal in the paragraph bridging page 8 and 9 in the parent application 09/594,059, at least some of the reaction parameters overlap and the determination or optimization of such parameters would have been within the ordinary skill in this art.

The argument that Haag does not render obvious the recycle of hydrogen as specified in claim 5 is not persuasive since the recycle of unreacted reactant would have been obvious to decrease the cost of the material. Similarly, as decided by the Board, the recycling any unreacted olefinic reactants would have been obvious to decrease the cost of the feedstock and to increase the yield of the product (see page 13 of the Decision on Appeal of the parent application 09/594,059).

The argument that regarding claim 21, Haag does not address the subject of dienes is not persuasive as decided by the Board on the paragraph bridging pages 9 and 10 of the Decision on Appeal of the parent application 09/594,059.

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The argument that regarding claims 10 and 11, to arrive at the use of a silicalite or a catalyst having a silicon/aluminum atomic ratio of at least 180 is only with the benefit of a hindsight after reviewing appellants' disclosure is not persuasive as decided by the Board on the single full paragraph on page 10 of the Decision on Appeal of the parent application 09/594,059.

The argument that regarding claims 6-9 and 26-29, the addition of ethylene to the feedstock is not disclosed in either Haag or Colombo is persuasive as decided by the Board on the paragraph bridging pages 12 and 13 of the Decision on Appeal of the parent application 09/594,059.

The argument that regarding claims 7 and 28, the addition of ethylene to the feedstock is not disclosed in either Haag or Colombo is persuasive as decided by the Board on the paragraph bridging pages 12 and 13 of the Decision on Appeal of the parent application 09/594,059.

The argument that regarding claims 14 and 31, Colombo does not disclose a propylene yield on an olefin basis of 30-50% based on the olefin content is persuasive as decided by the Board on the full paragraph on page 13 of the Decision on Appeal of the parent application 09/594,059.

Regarding claim 28, the argument that the separation and recovery of the components in the product is not found in or rendered obvious by the prior art is not persuasive since the recovery of the desired products from the reaction effluent is obvious and well-known in the industry.

Regarding claims 32 and 33, the argument that the prior art would not result in the use of an MFI-type catalyst having a silicon/aluminum atomic ratio with the relatively narrow confines

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called for these claims is not persuasive since as decided by the Board on the paragraph bridging pages 10 and 11 of the Decision on Appeal of the parent application 09/594,059.

(11) Related Proceeding(s) Appendix

Copies of the court or Board decision(s) identified in the Related Appeals and Interferences section of this examiner's answer are provided herein.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

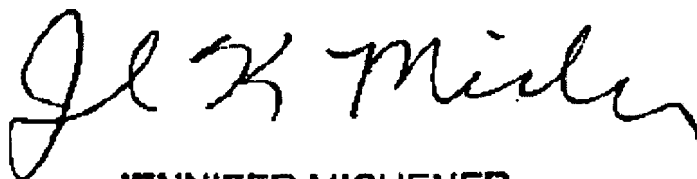
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